

IN THE CLAIMS

Please cancel claims 5 and 10, amend claims 2, 6, 7, and 11, and add new claim 12 as follows:

1. (ORIGINAL) A method of generating a scrambled signal having real symbols $I_{s,k}$ and imaginary signals $Q_{s,k}$ from a signal having real symbols I_k and imaginary symbols Q_k , comprising the steps of:

generating a real part of a k^{th} element of a complex scrambling sequence ($d_{I,k}$);

generating an imaginary part of the k^{th} element of the complex scrambling sequence ($d_{Q,k}$);

generating a scrambling phase multiplier n_k according to:

$$n_k = 2d_{I,k} + d_{Q,k}; \text{ and}$$

generating the scrambled signal:

$$I_{s,k} + jQ_{s,k} = (I_k + jQ_k)e^{j\left(\frac{2\pi n_k}{4}\right)}.$$

2. (CURRENTLY AMENDED) A method of scrambling symbols in a data transmission system, comprising:
 scrambling all elements of a frame prior to transmission of the frame by the system so that all of the elements have a common reference phase; [[.]]

wherein the scrambling step comprises performing a complex scrambling operation according to:

$$\underline{I_{s,k} + jQ_{s,k} = (I_k + jQ_k) \cdot \exp \left\{ j \frac{2\pi n_k}{4} \right\}}$$

wherein:

I_k, Q_k represents original symbols,

$I_{s,k}, Q_{s,k}$ represents scrambled symbols,

n_k represents a scrambling phase multiplier, such that $n_k = 2d_{I,k} + d_{Q,k}$, and

$d_{I,k}$ and $d_{Q,k}$ are real (I) and imaginary (Q) components of a k^{th} element of the complex scrambling sequence.

3. (ORIGINAL) The method of claim 2, wherein the elements of the frame comprise a frame header or frame body.

4. (ORIGINAL) The method of claim 2, wherein the elements of the frame further comprise one or more pilot symbols.

5. (CANCELED)

6. (CURRENTLY AMENDED) The method of claim [[5]] 2, wherein the complex scrambling operation comprises simple component swapping and sign changing according to:

$d_{I,k}$	$d_{Q,k}$	n_k	Rotation	$I_{S,k} + jQ_{S,k}$
0	0	0	0°	$I_k + jQ_k$
0	1	1	90°	$-Q_k + jI_k$
1	0	2	180°	$-I_k - jQ_k$
1	1	3	270°	$Q_k - jI_k$

7. (CURRENTLY AMENDED) An apparatus for scrambling symbols in a data transmission system, comprising:

means for scrambling all elements of a frame prior to transmission of the frame by the system so that all of the elements have a common reference phase, the means for scrambling comprising means for performing a complex scrambling operation according to: [[.]]

$$I_{S,k} + jQ_{S,k} = (I_k + jQ_k) \cdot \exp \left\{ j \frac{2\pi n_k}{4} \right\}$$

wherein:

I_k, Q_k represents original symbols,

$I_{S,k}, Q_{S,k}$ represents scrambled symbols,

n_k represents a scrambling phase multiplier, such that $n_k = 2d_{I,k} + d_{Q,k}$, and

$d_{I,k}$ and $d_{Q,k}$ are real (I) and imaginary (Q) components of a k^{th} element of the complex scrambling sequence.

8. (ORIGINAL) The apparatus of claim 7, wherein the elements of the frame comprise a frame header or frame body.

9. (ORIGINAL) The apparatus of claim 7, wherein the elements of the frame further comprise one or more pilot symbols.

10. (CANCELED)

11. (CURRENTLY AMENDED) The apparatus of claim [[10]] 7, wherein the complex scrambling operation comprises simple additions and subtractions according to:

$d_{I,k}$	$d_{Q,k}$	n_k	Rotation	$I_{S,k} + jQ_{S,k}$
0	0	0	0°	$I_k + jQ_k$
0	1	1	90°	$-Q_k + jI_k$
1	0	2	180°	$-I_k - jQ_k$
1	1	3	270°	$Q_k - jI_k$

12. (NEW) An apparatus for generating a scrambled signal having real symbols $I_{S,k}$ and imaginary signals $Q_{S,k}$ from a signal having real symbols I_k and imaginary symbols Q_k , comprising:

means for generating a real part of a k^{th} element of a complex scrambling sequence ($d_{I,k}$);

generating an imaginary part of the k^{th} element of the complex scrambling sequence ($d_{Q,k}$);

means for generating a scrambling phase multiplier n_k according to:

$$n_k = 2d_{I,k} + d_{Q,k}; \text{ and}$$

means for generating the scrambled signal:

$$I_{S,k} + jQ_{S,k} = (I_k + jQ_k)e^{j\left(\frac{2\pi n_k}{4}\right)}.$$